a second plurality of laser beam folding mirrors disposed within said vertical section;

a first laser beam production module for producing a first laser beam, and a second laser beam production module for producing a second laser beam;

a first polygonal scanning element disposed within said horizontal section and having multiple reflective surfaces rotating about a first axis of rotation, for scanning said first laser beam and producing a first laser scanning beam that reflects off said first plurality of laser beam folding mirrors to generate and project a first plurality of laser scanning planes through said horizontal-scanning window; and

a second polygonal scanning element disposed within said vertical section and having multiple reflective surfaces rotating about a second axis of rotation, for scanning said second laser beam and producing a second laser scanning beam that reflects off said second plurality of laser beam folding mirrors to generate and project a second plurality of laser scanning planes through said vertical-scanning window,

whereby said first and second pluralities of laser scanning planes (i) intersect within predetermined scan regions contained within a 3-D scanning volume defined between said horizontal-scanning and vertical-scanning windows, and (ii) generate a plurality of groups of quasi-orthogonal laser scanning planes within said 3-D scanning volume, and

wherein said plurality of groups of quasi-orthogonal laser scanning planes form a complex omni-directional 3-D laser scanning pattern within said 3-D scanning volume capable of scanning a bar code symbol located on the surface of an object presented within said 3-D scanning volume at any orientation and from any direction at said POS station.

Claim 32 (previously presented): The bioptical laser scanning system of claim 31, wherein the height dimension of the said horizontal section is less than about 4.5 inches for installation of said horizontal section within a countertop surface at said POS.

Claim 33 (previously presented): The bioptical laser scanning system of claim 31, wherein said plurality of groups of quasi-orthogonal laser scanning planes comprises over 60 different laser scanning planes cooperating within said 3-D scanning volume to generate said complex omni-directional 3-D laser scanning pattern.

Claim 34 (currently amended): The bioptical laser scanning system of claim 33, wherein each said group of quasi-orthogonal laser scanning planes comprises (i) a plurality of substantially-vertical laser scanning planes for reading bar code symbols having bar code elements (i.e., ladder type bar code symbols) that are oriented substantially horizontal with respect to said horizontal-scanning window, and (ii) a plurality of substantially-horizontal laser scanning ~~plane~~ planes for reading bar code symbols having bar code elements (i.e., picket-fence type bar code symbols) that are oriented substantially vertical with respect to said horizontal-scanning window.

Claim 35 (previously presented): The bioptical laser scanning system of claim 31, wherein said first laser beam production module comprises a first visible laser diode (VLD), and said second laser beam production module comprises a second visible laser diode (VLD).

Claim 36 (previously presented): The bioptical laser scanning system of claim 31, wherein said first plurality of laser beam folding mirrors and said first laser production module cooperate with first and second light collecting/focusing optical elements and first and second photodetectors disposed within said bottom housing section to form first and second scanning stations disposed about said first polygonal scanning element, and

wherein the light collecting/focusing optical element within each said laser scanning station collects light from predetermined scan regions within said 3-D scanning volume and focuses such collected light onto the photodetector to produce an electrical signal having an amplitude proportional to the intensity of light focused thereon, and said electrical signal being supplied to analog/digital signal processing circuitry for processing analog and digital scan data signals derived therefrom to perform bar code symbol reading operations.

Claim 37 (currently amended): The bioptical laser scanning system of claim 36, wherein said second plurality of laser beam folding mirrors and said second laser production module cooperate with a third light collecting/focusing optical element and a third photodetector disposed within said vertical housing section to form a third scanning station disposed about said second polygonal scanning element, and

wherein the light collecting/focusing optical element within said third laser scanning station collects light from predetermined scan regions within said 3-D scanning volume and focuses such collected light onto the photodetector to produce an electrical signal having an amplitude proportional to the intensity of light focused thereon, and said electrical signal being supplied to analog/digital signal processing circuitry for processing analog and digital scan data signals derived therefrom to perform bar code symbol reading operations.

Claim 38 (previously presented): The bioptical laser scanning system of claim 31, wherein said first polygonal scanning element comprises a first polygonal scanning mirror having a first plurality of rotating mirror facets, and wherein said polygonal scanning element comprises a second polygonal scanning mirror having a second plurality of rotating mirror facets.

Claim 39 (previously presented): The bioptical laser scanning system of claim 38, wherein said second plurality of rotating mirror facets on said second polygonal scanning mirror are classifiable into a first class of facets having High Elevation (HE) angle characteristics, and a second class of facets having Low Elevation (LE) angle characteristics.

Claim 40 (previously presented): The bioptical laser scanning system of claim 39, wherein said high and low elevation angle characteristics are referenced by a plane P1 that contains the incoming laser beam and is normal to the rotational axis of said second polygonal scanning mirror;

wherein each facet in said first class of facets, having high beam elevation angle characteristics, produces an outgoing laser beam that is directed above the plane P1 as the facet sweeps across the point of incidence of said third laser scanning station; and

wherein each facet in said second class of facets, having low beam elevation angle characteristics, produces an outgoing laser beam that is directed below the plane P1 as the facet sweeps across the point of incidence of said third laser scanning station.

Claim 41 (currently amended): The bioptical laser scanning system of claim ~~31~~ 38, wherein said complex omni-directional 3-D laser scanning pattern is generated from said horizontal-scanning

window and said vertical-scanning window during the revolution of said first and second polygonal scanning mirrors.

Claim 42 (previously presented): The bioptical laser scanning system of claim 38, wherein during each revolution of said first polygonal scanning mirror, a first group of laser scanning planes are produced by said first and second laser scanning stations, and concurrently therewith, during each revolution of said second polygonal scanning mirror, second and third groups of laser scanning planes are produced by said third laser scanning station.

Claim 43 (previously presented): A bioptical laser scanning system capable of scanning a bar code symbol located on the surface of an object presented within a 3-D scanning volume at any orientation and from any direction at a point of sale (POS) station, said bioptical laser scanning system comprising:

a housing having a bottom housing section integrally connected to a side housing section;

a bottom-scanning window provided in said bottom housing section;

a side-scanning window provided in said side housing section, and being substantially orthogonal to said bottom-scanning window;

a first plurality of laser beam folding mirrors disposed within said bottom housing section;

a second plurality of laser beam folding mirrors disposed within said side housing section;

a first laser beam production module for producing a first laser beam, and a second laser beam production module for producing a second laser beam;

a first polygonal scanning element disposed within said bottom housing section and having multiple reflective surfaces rotating about a first axis of rotation, for scanning said first laser beam and producing a first laser scanning beam that reflects off said first plurality of laser beam folding mirrors to generate and project a first plurality of laser scanning planes through said bottom-scanning window, and

a second polygonal scanning element disposed within said side housing section and having multiple reflective surfaces rotating about a second axis of rotation, for scanning said second laser beam and producing a second laser scanning beam that reflects off said second plurality of laser beam folding mirrors to generate and project a second plurality of laser scanning planes through said side-scanning window,

whereby said first and second pluralities of laser scanning planes (i) intersect within predetermined scan regions contained within a 3-D scanning volume defined between said bottom-scanning window and side-scanning window, and (ii) generate a plurality of groups of quasi-orthogonal laser scanning planes within said 3-D scanning volume, and

wherein said plurality of groups of quasi-orthogonal laser scanning planes form a complex omni-directional 3-D laser scanning pattern within said 3-D scanning volume capable of scanning a bar code symbol located on the surface of an object presented within said 3-D scanning volume at any orientation and from any direction at said POS station.

Claim 44 (previously presented): The bioptical laser scanning system of claim 43, wherein the height dimension of the said bottom housing section is less than about 4.5 inches for installation of said bottom housing section within a countertop surface at said POS.

Claim 45 (previously presented): The bioptical laser scanning system of claim 43, wherein said plurality of groups of quasi-orthogonal laser scanning planes comprises over 60 different laser scanning planes cooperating within said 3-D scanning volume to generate said complex omni-directional 3-D laser scanning pattern.

Claim 46 (previously presented): The bioptical laser scanning system of claim 45, wherein each said group of quasi-orthogonal laser scanning planes comprises (i) a plurality of substantially-vertical laser scanning planes for reading bar code symbols having bar code elements (i.e., ladder type bar code symbols) that are oriented substantially horizontal with respect to said bottom-scanning window, and (ii) a plurality of substantially-horizontal laser scanning plane for reading bar code symbols having bar code elements (i.e., picket-fence type bar code symbols) that are oriented substantially vertical with respect to said bottom-scanning window.

Claim 47 (previously presented): The bioptical laser scanning system of claim 43, wherein said first laser beam production module comprises a first visible laser diode (VLD), and said second laser beam production module comprises a second visible laser diode (VLD).

Claim 48 (previously presented): The bioptical laser scanning system of claim 43, wherein said first plurality of laser beam folding mirrors and said first laser beam production module cooperate with first and second light collecting/focusing optical elements and first and second photodetectors disposed within said bottom housing section to form first and second scanning stations disposed about said first polygonal scanning element, and

wherein the light collecting/focusing optical element within each said laser scanning station collects light from predetermined scan regions within said 3-D scanning volume and focuses such collected light onto the photodetector to produce an electrical signal having an amplitude proportional to the intensity of light focused thereon, and said electrical signal being supplied to analog/digital signal processing circuitry for processing analog and digital scan data signals derived therefrom to perform bar code symbol reading operations.

Claim 49 (currently amended): The bioptical laser scanning system of claim 48, wherein said second plurality of laser beam folding mirrors and said second laser beam production module cooperate with a third light collecting/focusing optical element and a third photodetector disposed within said vertical housing section to form a third scanning station disposed about said second polygonal scanning element, and

wherein the light collecting/focusing optical element within said third laser scanning station collects light from predetermined scan regions within said 3-D scanning volume and focuses such collected light onto the photodetector to produce an electrical signal having an amplitude proportional to the intensity of light focused thereon, and said electrical signal being supplied to analog/digital signal processing circuitry for processing analog and digital scan data signals derived therefrom to perform bar code symbol reading operations.

Claim 50 (previously presented): The bioptical laser scanning system of claim 43, wherein said first polygonal scanning element comprises a first polygonal scanning mirror having a first plurality of rotating mirror facets, and wherein said said polygonal scanning element comprises a second polygonal scanning mirror having a second plurality of rotating mirror facets.

Claim 51 (previously presented): The bioptical laser scanning system of claim 50, wherein said second plurality of rotating mirror facets on said second polygonal scanning mirror are classifiable into a first class of facets having High Elevation (HE) angle characteristics, and a second class of facets having Low Elevation (LE) angle characteristics.

Claim 52 (previously presented): The bioptical laser scanning system of claim 43, wherein said high and low elevation angle characteristics are referenced by a plane P1 that contains the incoming laser beam and is normal to the rotational axis of said second polygonal scanning mirror;

wherein each facet in said first class of facets, having high beam elevation angle characteristics, produces an outgoing laser beam that is directed above the plane P1 as the facet sweeps across the point of incidence of said third laser scanning station; and

wherein each facet in said second class of facets, having low beam elevation angle characteristics, produces an outgoing laser beam that is directed below the plane P1 as the facet sweeps across the point of incidence of said third laser scanning station.

Claim 53 (currently amended): The bioptical laser scanning system of claim ~~43~~ 50, wherein said complex omni-directional 3-D laser scanning pattern is generated from said bottom-scanning window and said side-scanning window during each revolution of said first and second polygonal scanning mirrors.

Claim 54 (previously presented): The bioptical laser scanning system of claim 50, wherein during each revolution of said first polygonal scanning mirror, a first group of laser scanning planes are produced by said first and second laser scanning stations, and concurrently therewith,

during each revolution of said second polygonal scanning mirror, second and third groups of laser scanning planes are produced by said third laser scanning station.

Claim 55 (previously presented): A bioptical laser scanning system, wherein a single visible laser diode (VLD) is used to create a laser scanning pattern projected through a side-scanning window.

Claim 56 (previously presented): A bioptical laser scanning system which generates a plurality of quasi-orthogonal laser scanning planes that project through a bottom-scanning window and a side-scanning window to provide 360 degrees of scan coverage at a POS station.

Claim 57 (previously presented): A bioptical laser scanning system providing 360 degrees of scan coverage at a POS station comprising a means for producing a plurality of pairs of quasi-orthogonal laser scanning planes that are projected within predetermined scanning regions contained within a 3-D scanning volume defined between bottom and side scanning windows of the system.